Message

**From:** Kay, Robert [rtkay@usgs.gov]
**Sent:** 9/8/2016 4:38:29 PM
**To:** Nordine, John [nordine.john@epa.gov]
**Subject:** Re: FW: Techalloy, Union, Il Plume Migration

John--for request #1. i can't beleive someone who has been working in the groundwater business for more than 1 month doesn't know how to calculate groundwater velocity. it's a minor variation on Darcy's Law, which is the foundation of the science for christs' sake!

although horizontal hydraulic conductivty is used in the calculation of groundwater velocity, it is not a measurement of groundwater veloocity. Autumwood needs to look up the Darcy velocity equation and correctly calculate time of travel.

request #2. i find the 16.5 week estimate to be a reasonable estimate of the minimum amount of time required for contamination to make it to the Ex. 6 Personal Privacy (PP) from GP-27. Given this estimate, and the fact that the plume was at GP-27 something like 9 weeks ago, it would be prudent to increase the sampling frequency at the Ex. 6 Personal Privacy (PP) to something like every 2 months during the summer, starting at the end of this month.

On Thu, Sep 8, 2016 at 9:45 AM, Jack Thorsen <jack@autumnwoodesh.com> wrote:

> John:
>
> In response to your August 25, 2016 email to Mr. Ruopp at Central Wire, we offer you the following:
>
> Request No. 1:
>
> Calculate time of travel from the leading edge of the plume to the South Branch Nursery Well assuming the well is not pumped and there is no attenuation of the plume.
>
> From the Weston Solutions May 8, 1997 letter to Mr. Buller at EPA (Attachment 1 to my August 24, 2016 email to you), page 4 identifies the calculated hydraulic conductivity near Extraction Well No.1 as 377 feet/day. I remeasured the distance from the South Branch irrigation well to GP-27 at 820 ft. (and I measured 780 feet from the well to GP-23). At 377 feet per day it would take 2.175 days or 50 hours for water located at GP-27 to reach the South Branch irrigation well, assuming no contaminant attenuation.

Request No. 2:

Perform a separate calculation of time of travel for the plume if the well is pumped according to its typical weekly pumping regimen.

As a crude rule of thumb, it has taken 48 years (1968 to 2016) [Techalloy started using TCE in 1968] to reach GP-27, i.e., for the plume to move 7,460 feet from the point of discharge on the Central Wire property or about 155 feet per year. At that rate it would take 5.3 years or 5 years and almost 4 months to travel 820 feet.

Regarding Bob's point of clarification, if Bob's calculation is correct, it will take 16 1/2 weeks to reach the well. Ex. 6 Personal Privacy (PP) is pumping about 58,000 gallons each week day and returning about 80 to 90% back to the aquifer. By then, it will be the end of September and South Branch has indicated that is when they terminate their irrigation for the year.

Central Wire collects samples every six months, usually in June and December, at the Ex. 6 Personal Privacy (PP) Ex. 6 Personal Privacy (PP) well. To date (since 2007) there have been no detections of Volatile Organic Compounds.

Regards,

Jack

*John W. Thorsen, P.E.*

*Autumnwood ESH Consultants*

*262.237.1130*

**From:** Nordine, John [mailto:nordine.john@epa.gov]
**Sent:** Thursday, August 25, 2016 10:49 AM
**To:** Gerry Ruopp <gerry.ruopp@centralwire.com>

**Cc:** Jack Thorsen <jack@autumnwoodesh.com>; Bob Kay <rtkay@usgs.gov>
**Subject:** Techalloy, Union, Il Plume Migration

Mr. Ruopp,

Thank you for the Distance Drawdown Calculation for the Ex. 6 Personal Privacy (PP) Well. With the information from the Distance Drawdown Calculation for the Ex. 6 Personal Privacy (PP) Well, calculate time of travel from the leading edge of the plume to the Ex. 6 Personal Privacy (PP) assuming the well is not pumped and there is no attenuation of the plume, and perform a separate calculation of time of travel for the plume if the well is pumped according to its typical weekly pumping regimen. This will provide us with a reasonable time frame that the Ex. 6 Personal Privacy (PP) well may be affected by the plume.

Also, please verify the distance from the Ex. 6 Personal Privacy (PP) well to the GP-27. I double checked the distance on Google Earth and I get a distance to from the Nursery well to GP-27 of about 780 ft as well as to GP-23, not the 845 ft Autumwood claims. It has minimal impact on the drawdown calculation, but will have some impact on the time of travel calculation. If you have any questions please contact me.

Respectfully,

John Nordine, CPG, LPG
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"The great end of education is to discipline rather than finish the mind; to train it to use of its own powers rather than to fill it with the accumulation of others." Tryon Edwards
"Don't interfere with anything in the Constitution. That must be maintained, for it is the only safeguard of our liberties" Abraham Lincoln

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